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% Date: 01-28-19
% Section #202
% Project 1: Rent Analyzer: Spring 2019
clc;clear;close('all');

%%
% Part 2.2

% Input wanted from the user
fileInput = input('Enter Input File: ', 's');

% Retrieving the Input Data
oInputData = xlsread(fileInput);

% Assigning Numbers to represent the counties.
countyNumber =(1:99)';
% Using VertCat to add colomName and input Values
inputData = [countyNumber, oInputData];

% Resaving the data in coloms to singular coloms.
% Renaming all the singular coloms.
TotalHouseholds = inputData(:,2 );
RenterHouseholds = inputData(:,3 );
PercentOfHouseholdsThatAreRenters = inputData(:, 4);
MinWage = inputData(:, 5);
EstimatedRenterWage = inputData(:, 6);
AreaMedianHouseholdIncome = inputData(:, 7);
EstimatedRenterHouseholdIncome = inputData(:, 8);
TwoBedroomFairMarketRent = inputData(:, 9);

%%
% Part 2.3

% Assigning a variable to assumptions in Part 2.3
hoursWorkedPerWeek = 40;
weeksPerMonth = 4.33;
percentSpentOnRent = 0.30;
monthsInAYear = 12;
weeksPerYear = 52;

% Part A
% Finding Total Yearly Income For Min Wage Worker
totalYearlyIncomeMinWage = MinWage .* hoursWorkedPerWeek .* weeksPerYear;
% Cited by TA Austin who helped me figure out the correct values to
% multiply by, 02-01-19, happened during office hours

% Finding The Amount That Can Be Allocated To Rent- Min Wage
incomeAllocatRentMinWage = totalYearlyIncomeMinWage .* ...
    percentSpentOnRent;

% Finding the Rent affordability for Min Wage
rentAffordPerMonthMinWage = incomeAllocatRentMinWage ./ ...
    monthsInAYear;

% Finding the Min wage
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MinWageNC = mean(MinWage);

% Finding the avg total yearly income for Min Wage
avgTotalYearlyIncomeMinWage = mean(totalYearlyIncomeMinWage);

% Part B – Non Min Wage
% EARW is equal to Estimated Average Renter Wage
% EARW Total Yearly Income Equation
totalYearlyIncomeEARW = EstimatedRenterWage .* hoursWorkedPerWeek ...
    .* weeksPerYear;

% EARW Income Allocated For Rent
incomeAllocatRentEARW = totalYearlyIncomeEARW .* percentSpentOnRent;

% Finding Rent Affordability for EARW
rentAffordPerMonthEARW = incomeAllocatRentEARW ./ monthsInAYear;

% Finding EARW– NC avg
EARWNC = mean(EstimatedRenterWage);

% Part C
% Average Fair Market Rent by county
avgFairMarketRentcounty = TwoBedroomFairMarketRent;

% Average Fair Market Rent NC average
avgFairMarketRentNC = mean(TwoBedroomFairMarketRent);

% Part D
% Average housing wage for a 2 bedroom – counties
avgHousingWagecounty = avgFairMarketRentcounty ./ (hoursWorkedPerWeek .*...
    percentSpentOnRent.* weeksPerMonth);

% Average housing wage for a 2 bedroom – NC average
avgHousingWageNC = mean(avgHousingWagecounty);

% Part E
% Extra money per month needed to afford Avg fair market rent – county
moneyDiffAFMRMinWageCounty = avgFairMarketRentcounty...
    - rentAffordPerMonthMinWage;
% Extra hours that need to be worked for a Min Wage worker to afford an AFM
% appt
extraHoursNeedWorkMinWageCounty = moneyDiffAFMRMinWageCounty ./ (MinWage .*...
    weeksPerMonth .* percentSpentOnRent);

%Extra money per month needed to afford Avg fair market rent – NC avg
moneyDiffAFMRMinWageNC = mean(moneyDiffAFMRMinWageCounty);
%Extra hours needed to work – NC avg
extraHoursNeedWorkMinWageNC = mean(extraHoursNeedWorkMinWageCounty);
% Total hours worked per week to make enough money for rent Min Wage
totalHoursWorkedAFMMinWage = extraHoursNeedWorkMinWageNC + hoursWorkedPerWeek;

% Part F
% Extra money needed per month Average Renter Wage
moneyDiffEARWCounty = avgFairMarketRentcounty - rentAffordPerMonthEARW;

% Extra money per month needed to afford Avg fair market rent – county
extraHoursNeedWorkeARWCounty = mean(moneyDiffEARWCounty)...
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./ (mean(EstimatedRenterWage) .* percentSpentOnRent .* weeksPerMonth);

% Extra money per month needed to afford Avg fair market rent EARW – state
moneyDiffAFMReARWNC = mean(moneyDiffEARWCounty);
% Extra hours needed to work – NC Avg
extraHoursNeedWorkEARWNC = mean(extraHoursNeedWorkEARWCounty) ;
% Total hours worked per week to make enough money for rent EARW
totalHoursWorkedAFMREARW = extraHoursNeedWorkEARWNC + hoursWorkedPerWeek;

%%
% Part 2.5 – Plotting

% Part A
% Short Fall in rent variable
ShortfallBetweenEWandAHW = EstimatedRenterWage – avgHousingWagecounty;
% Setting Up Figure 1
figure(1);
grid on

% Setting up the plot for the top graph
subplot(2, 1, 1);
plot(countyNumber, EstimatedRenterWage, 'b*', countyNumber, ...
      avgHousingWagecounty, 'dk', countyNumber, MinWage, '-r');

% Creating Titles, labels, and legend for fig 1 sub 1
title('Wages, NC 2018');
xlabel('Counties');
ylabel('Dollars Per Hour');
legend('Estimated Wages', 'Housing Wages', 'Min Wage');

% Setting up the plot for the bottom graph
subplot(2, 1, 2)
bar(ShortfallBetweenEWandAHW);

% Creating Title, Labels, and legend for fig 1 sub 2
title('Shortfall between Estimated Wages and Housing Wages, NC 2018');
xlabel('Counties');
ylabel('Dollars Per Hour');

% Part B

% Annual Income Comparison = AIC
%Changing names of variables so it is easier to use with logical indexing
a= EstimatedRenterHouseholdIncome; b = AreaMedianHouseholdIncome;

% Creating Category max
% Using these max category values to avoid hard coding for the sum of the
% category numbers.
cat1Max = 30000; % Max value for the first category given– AIC
cat2Max = 35000;
cat3Max = 45000;
cat4Max = 75000;
cat5Min = 75000; % Min value for the last category since we want to
% include all data above 75000, not below

% Creating array for bar graph by finding the number of counties in each
% income category for renters and general annual income.
RentersByCategory = [sum(a<cat1Max), sum(a<cat2Max)–sum(a<cat1Max), ...

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sum(a<cat3Max)- sum(a<cat2Max),sum(a<cat4Max)- sum(a<cat3Max), ...
sum(a>cat5Min)];
AnnualByCategory = [sum(b<cat1Max), sum(b<cat2Max)-sum(b<cat1Max), ...
sum(b<cat3Max)- sum(b<cat2Max),sum(b<cat4Max)- sum(b<cat3Max), ...
sum(b>cat5Min)];
% Transposing Rent by Cat and Annual by category
RentersByCategorygraph = RentersByCategory';
AnnualByCategorygraph = AnnualByCategory';

% Horzcatting the two matrices
AnnualIncomeComparisonMaxtrix = [AnnualByCategorygraph, ...
RentersByCategorygraph];

% Creating Figure 2
figure(2);

% Creating Bar Graph
bar(AnnualIncomeComparisonMaxtrix);
grid on

% Creating title, labels and legend for graph
title('Annual Income Comparison');
ylabel('Number of Counties');
set(gca, 'XTickLabel', {'Less 30K', 'Less 35K', 'Less 45K', 'Less 75K', ...
'Greater 75k'});
legend('Annual Avg Income', 'Annual Renter Income');

%%
% Printing all of the information onto the command window.
fprintf('\n\n');

% Printing the tittle of the output
fprintf('Income and Rent Affordability for full time, 40 hrs/week job\n');

% Creating a line of Stars
% Cited by TA Austin 02-01-19 in office hours, he helped me print the
% stars.
fprintf('*****\n\n');

% Creating a matrix with all of the elements needed to print for min wage.
% Using this so I can clearly see what I need to print and not printing it
% directly.
printMwords = ['Min Wage', 'Total Yearly Income', 'Income for monthly rent', ...
'Rent affordability'];
printMnum = [MinWageNC, avgTotalYearlyIncomeMinWage,mean(incomeAllocatRentMinWage),...
mean(rentAffordPerMonthMinWage)];
% Using fprintf to print this data for Min wage.
fprintf('          Min Wage: %10.2f\n', MinWageNC);
fprintf('          Total Yearly Income: %10.2f\n', avgTotalYearlyIncomeMinWage);
fprintf(' Income for monthly rent: %10.2f\n', mean(incomeAllocatRentMinWage));
fprintf('          Rent affordability: %10.2f\n', mean(rentAffordPerMonthMinWage));

% Creating one blank row
fprintf('\n');

% Creating a matrix with all of the elements needed to print for EARW.

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% Using this so I can clearly see what I need to print and not printing it
% directly.
printEwords = ['Estimated Average Wage', 'Total Yearly Income',...
    'Income for monthly rent','Rent affordability'];
printEnum = [EARWNC,mean(totalYearlyIncomeEARW) ,mean(incomeAllocatRentEARW),...
    mean(rentAffordPerMonthEARW)];
% Using fprintf to print the data for EARW
fprintf('    Estimated Average Wage: %10.2f\n', EARWNC);
fprintf('    Total Yearly Income: %10.2f\n', mean(totalYearlyIncomeEARW));
fprintf('    Income for monthly rent: %10.2f\n', mean(incomeAllocatRentEARW));
fprintf('    Rent affordability: %10.2f\n', mean(rentAffordPerMonthEARW));

%Creating one blank row
fprintf('\n');

% Creating a row of stars and a blank row to follow
fprintf('*****\n');

% Creating one blank row
fprintf('\n');

% Creating the Matrixes that are needed to print the last set of data.
% Using this so I can clearly see what I need to print and not printing it
% directly.
printL1words = ['Average Fair Market Rent for 2 bedroom', ...
    'Requires Average Housing Wage']; % labels for the first half of last part
printL2words = ['Min Wage Workers need additional:',...
    'Avg Wage Workers need additional']; %labels for the second half of the last part
printL1num = [avgFairMarketRentNC, avgHousingWageNC]; % data for the first half
printL2num = [totalHoursWorkedAFMMinWage, totalHoursWorkedAFMREARW]; % data for the
second half

% Creating an fprintf funtions to print fair market information.
fprintf('Average Fair Market Rent for 2 bedroom: %6.2f\n',avgFairMarketRentNC);
fprintf('    Requires Average Housing Wage: %6.2f\n',avgHousingWageNC);
fprintf('Min Wage Workers need additional: %7.2f and thus work %2.0f hrs/per week\n', ...
    moneyDiffAFMRMinWageNC,totalHoursWorkedAFMMinWage);
fprintf('Avg Wage Workers need additional: %7.2f and thus work %2.0f hrs/per week\n', ...
    moneyDiffAFMReARWNC,totalHoursWorkedAFMREARW);
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